

a loading station disposed in connection with the mainframe having one or more loading station robots;

two or more processing stations disposed in connection with the mainframe, wherein each processing station comprises two or more electrochemical deposition cells;

two or more cleaning modules connected between the loading station and the mainframe; and

two or more post deposition treatment chambers in connection with the loading station.

46. The deposition system of claim 45, further comprising a pass-through cassette disposed above the cleaning modules.

47. The deposition system of claim 45, wherein a processed substrate is transferred from the one of the electrochemical deposition cells into the pass-through cassette and transferred from the pass-through cassette using the loading station robots to one of the post deposition treatment chambers.

REMARKS

This is intended as a proposed response to the Office Action dated June 25, 2002, having a shortened statutory period for response set to expire on September 25, 2002. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-11, 18-20 and 21-47 are pending in the application and are subject to a restriction requirement. Applicants provisionally elect claims 21-47 with traverse.

Claims 1-11, 18-20 and 21-47 stand restricted under 35 U.S.C. § 121 as follows:

I. Claims 1-11 and 18-20, drawn to an electrochemical deposition system, classified in class 204, subclass 225+.

II. Claims 21-47, drawn to an electrochemical deposition system comprising an electrolyte replenisher, cleaning modules and post deposition treatments, classified in class 204, subclass 232+.

The Examiner states that the claims of Groups I and II are unrelated as defined in MPEP § 806.04, MPEP § 808.01. In particular, the Examiner states that the inventions have different modes of operation, different functions and different effects. Applicant respectfully traverses the restrictions.

Two different independent combinations may be restricted when they are not disclosed as capable of use together and have different modes of operation, different functions or different effects. M.P.E.P. § 806.04 and § 808.01. However, this basis for restriction "is to be used only when claims are presented to unrelated inventions, e.g., a necktie and a locomotive bearing." M.P.E.P. § 808.01.

The present restriction is inappropriate because the present claims do not recite totally unrelated and independent inventions. To the contrary, each of the Groups is related to substrate processing and, more particularly, to electro-chemical processing. Accordingly, each of the claims which the Examiner seeks to restrict includes a mainframe, a loading station, one or more electrochemical processing cells and some form of post processing chamber. Respectfully, the Examiner's suggestion that such closely related claims are as different as a "necktie and a locomotive bearing" is indefensible. Further, Applicants respectfully submit that the Examiner errs in suggesting that different inventions are "not disclosed as capable of use together and provide for different modes of operation as the apparatus of Group I does not comprise the replenisher, cleaning modules and post deposition treatment embodiments of Group II." The Examiner's assertion that the apparatus of Group I does not include some of the elements of Group II is not a basis for restriction. It is fundamental to the practice of patent law that different claims necessarily include different elements in order to be separately patentable. To be restrictable in the manner suggested by the Examiner, it is necessary that the claims of Group I and Group II not merely contain different elements, but are not disclosed as capable of use together. M.P.E.P. § 806.04 and § 808.01. In the present application, the claims are clearly disclosed as capable of use together. Consider for example Claim 1 of Group I and Claim 21 of Group II. Each claim recites a mainframe, a loading station, and an electrochemical deposition cell. One difference between the claims is that Claim I recites a thermal anneal chamber and Claim 21 recites one or more post deposition treatment chambers. However, in one embodiment,

the post deposition treatment chambers include a thermal anneal chamber as recited in Claim 32 of Group II. Accordingly, the Examiner errs in suggesting that the claims are not disclosed as capable of use together.

The Examiner's claim objection to the claim numbering is noted and the renumbering set forth by the Examiner is reflected in this Response.

A replacement declaration is submitted herewith to correct the deficiency identified by the Examiner.

Claims 21, 22, 24, 26-30, 32, 37-40 and 42-47 stand rejected under 35 U.S.C. 103(a) as being unpatentable over MAYDAN *et al.* (US 5,292,393; hereinafter *Maydan*) and TING *et al.* (US 6,187,152 B1; hereinafter *Ting*). Applicants respectfully traverse the rejection.

The rejected claims are directed to an electrochemical deposition system comprising one or more electrochemical deposition cells. Therefore, the apparatus of the rejected claims are adapted to process wafers in a fluid environment. *Maydan* teaches an integrated modular multiple chamber vacuum processing system. The processing system of *Maydan* includes a central transfer chamber (14) which houses a robot (80) adapted to service a plurality of vacuum chambers (16, 18, 20, 22). The system is adapted for enabling various types of vacuum processing including etch, deposition, sputtering and rapid thermal annealing. Accordingly, the processing system is limited to dry processes. Therefore, the reference does not teach, show or suggest an electrochemical deposition system comprising one or more electrochemical deposition cells.

Ting discloses a multiple station processing chamber used to deposit and/or remove a material on a semiconductor wafer. However, a person skilled in the art would not be motivated to combine *Ting* with the *Maydan* because *Maydan* is limited to dry processes and *Ting* is limited to wet processes. Further, *Ting* purports to be a fully integrated and isolated system which eliminates "the need for the repeated rinsing and drying required for a single processing chamber" (col. 2, line 53-54) and avoids exposure of the wafer to "ambient conditions while being moved from process to process" (col. 4, 49-50). Accordingly, since there is no apparent advantage to integrating the apparatus of *Ting* with that of *Maydan* a person skilled in the art would

not be motivated to combin *Ting* with *Maydan*. Therefore, Applicants request that the rejection be withdrawn and that the claims be allowed.

Claims 33-34 and 41 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the *Maydan* combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of *POLAN* et al. (US 4,568,431; hereinafter *Polan*). *Maydan* and *Ting* have been overcome for the reasons described above. Therefore, *Maydan* and *Ting*, alone or in combination with each other or any other reference, do not teach, show or suggest the claimed subject matter. *Polan* is directed to a system for treating metal foil. In particular, the foil (10) is conveyed between a plurality of treatment tanks via a plurality of rollers (12, 20, 22...). (See, Figure 1.) Accordingly, the system of *Polan* is in no way capable of handling wafers. Therefore, because the systems of *Maydan*, *Ting* and *Polan* are mutually incompatible, a person skilled in the art would not be motivated to combine the references. Therefore, Applicants request that the rejection be withdrawn and that the claims be allowed.

Claims 23, 35, 31, 35, 36 rejected under 35 U.S.C. 103(a) as being unpatentable over the *Maydan* combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of *LLOYD* et al. (US 6,290,865; hereinafter *Lloyd*). *Maydan* and *Ting* have been overcome for the reasons described above. Therefore, *Maydan* and *Ting*, alone or in combination with each other or any other reference, do not teach, show or suggest the claimed subject matter. *Lloyd* discloses a spin-rinse-dry apparatus which may be used to advantage with the present invention. However, because *Maydan* is directed exclusively to dry processes and *Lloyd* is directed to a wet-dry process, a person skilled in the art would not be motivated to combine the references. Therefore, Applicants request that the rejection be withdrawn and that the claims be allowed.

Claims 21, 32-36, 38, 41, 44 and 45 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 9 and 10 of U.S. Patent No. 6,136,163. A terminal disclaimer is submitted herewith to overcome the rejection.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary

references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or apparatus of the claimed invention. Having addressed all issues set out in the Office Action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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APPENDIX

21. (Amended) An electro-chemical deposition system, comprising:
a mainframe having a mainframe wafer transfer robot[s] disposed therein;
a loading station disposed in connection with the mainframe having one or more loading station robots;
one or more processing stations disposed in connection with the mainframe, wherein each processing station comprises one or more electrochemical deposition cells; and
one or more post deposition treatment chambers disposed in connection with the mainframe.
22. (Amended) The deposition system of claim 21, wherein the loading station further comprises one or more cassette receiving areas and at least one wafer orienter[d] to set a wafer.
23. (Amended) The deposition system of claim 21, wherein the one or more post deposition treatment chambers are one or more spin-rinse-dry modules and wherein the one or more loading station robots transfer wafers between the one or more cassette receiving areas and the one or more spin-rinse-dry modules.
25. (Amended) The deposition system of claim 21, wherein [the] one or more spin-rinse-dry modules are connected between the loading station and the mainframe.
29. (Amended) The deposition system of claim 21, wherein the mainframe wafer transfer robot comprises a plurality of individual robot arms to provide independent access of wafers in the one or more processing stations and [the] one or more spin rinse dry modules.
35. (Amended) The deposition system of claim 34, further comprising one or more spin-rinse-dry modules and wherein at least one of the one or more chemical storage tanks provides one or more chemicals to the spin-rinse-dry modules.

37. (Amended) The deposition system of claim [21]36, further comprising a pass-through cassette disposed above the spin-rinse-dry modules.